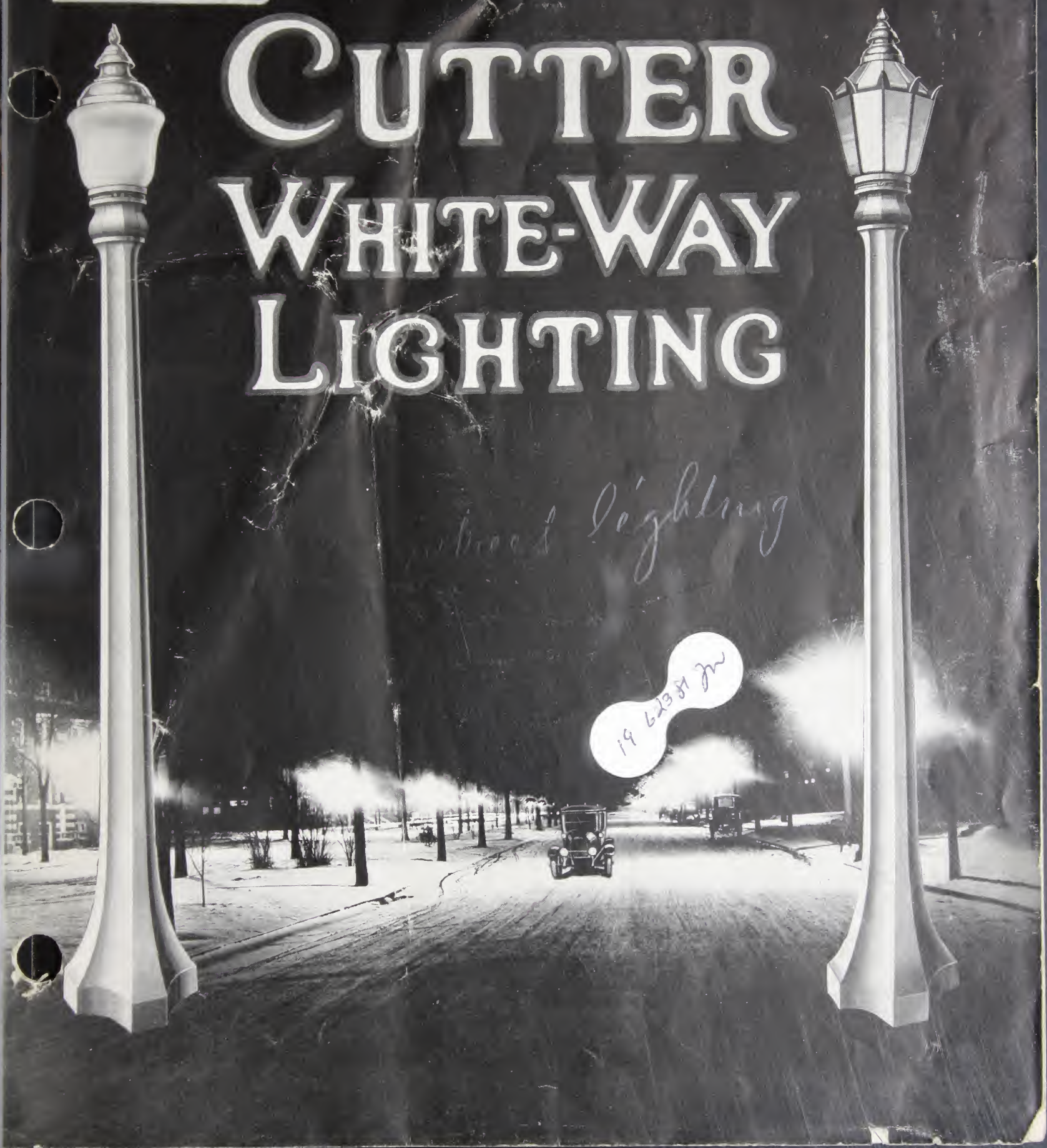
CUTTER WHITE-WAY LIGHTING



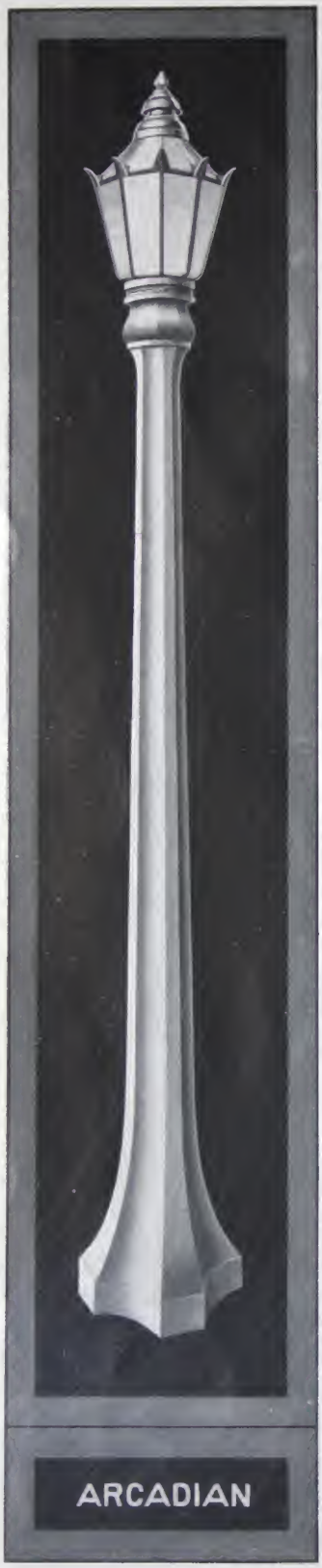


Fig. 1

A Few of the Things That
White-Way Lighting
Will Accomplish

White-Way Lighting will stimulate business because of the increased crowds from the city itself and from neighboring "dark" towns. People like to promenade brightly lighted streets, and while near the source of light are influenced to "spend" freely. Having purchased your wares under the most pleasing conditions, they talk about your business—they advertise your city.

White-Way Lighting will arouse civic pride, bring the community into accord, and make boosters of the knockers. It will inspire the public with confidence in the municipal authorities. The installation of a White-Way promotes other progressive civic improvements.

White-Way Lighting will make your city a better place in which to live. It will improve the morale of your city's people. The police value of a White-Way needs no proof. The rascal seeks the dark. Crime is lessened and the cost of burglar insurance is invariably lowered by White-Way Lighting.

Cutter White-Way Lighting will accomplish these things and much more at the minimum cost of operation and maintenance. Our Engineers, in making their recommendations and designs, are guided by the essentials described below:

The Essentials of White-Way Lighting Systems

The success of a White-Way depends on:

1. Appearance, that is, decoration by day and night.
2. Illumination, or the adequate lighting of streets, sidewalks and building facades.
3. Efficiency in operation and maintenance.

In the mind of the public, any White-Way system combining the first two essentials would at first be considered successful. The ultimate success of a system, however, depends not only upon these things—decoration and adequate illumination — but also upon the continuity of operation. This means that the merchants, property owners, taxpayers, and those in charge of municipal affairs should carefully consider the cost of operation and maintenance. The system should be reasonable in first cost, but not necessarily the lowest. It should be simple, reliable, easy of maintenance, and *low in operating cost.*

All of these results are obtained with the highest degree of success by the use of Mazda "C" lamps with Cutter White-Way equipment, a brief description of which will be found on the following pages.

Cutter
Arcadian and Suburban
White-Way Posts

The first and most important step to be taken toward the installation of a White-Way is to select the lighting standard. This should be an ornamental post cast of the highest quality of tough grey iron. The moulds should be made in steel flasks from metal patterns carefully carved and tooled to insure castings sharp and true to design. The design should be at once distinctive and harmonious. Simple elegance is preferable to the showy or ornate designs with "gingerbread" ornaments which only catch the dust and make cleaning and repainting tedious and expensive. The dimensions of the post should be in correct proportion throughout, so that the base gives stability without occupying excess space on the sidewalk. The column should have gracefully tapering lines—slender columns do not obstruct the view as do heavy massive ones.

The height should be sufficient to carry the light source well above the direct line of vision of pedestrians and automobilists. This is true particularly of the high-candlepower units. Finally, the post and lighting fixture should present a harmonious and pleasing combination so that, as a single unit, each standard will be attractive to the public by day and by night.

Cutter Arcadian and Suburban Posts when equipped with Octagonal or Sol-lux Tops afford everything that is desirable for White Way standards. The design of the two posts is identical, but the Arcadian is larger and heavier than the Suburban. It is adapted for use in large cities, whereas the Suburban is recommended for small cities and towns and for the residential districts, parks and boulevards in those cities using the Arcadian for the mercantile centers.

Single-Light vs. Cluster Posts

The advantages of single light posts may be stated briefly as follows:

1. Single light posts are more artistic than cluster posts, both singly and in perspective. The appearance of a street is greatly enhanced by single-light posts and the view along the street is not obstructed so much as by cluster styles.
2. Uni-directional light distribution obtained with single-light posts is more effective in increasing visibility at night than multi-directional light distribution obtained with cluster lighting.
3. The use of the most efficient lamps available and "Safety-First" devices is greatly facilitated by the installation of single light posts. The lamps are burned in series on high potential circuits and their operating cost and maintenance are reduced to a minimum by the use of compensators (auto-transformers) for lamps of the 15 or 20-ampere class. Regent Film Sockets are used for the straight series lamps of the 6.6 or 7.5-ampere class. The "Safety-First" principle is introduced by the use of a Cutter Disconnecting Pothead in the base of each post.
4. The maintenance of a single light post system is much lower than the cluster post because there is one globe, one lamp and one socket to clean, repair, or replace, and only the column and casing to paint, whereas for cluster posts there are from 3 to 5 globes, lamps and sockets to clean or replace and the column and arms must be painted.

Fig. 2

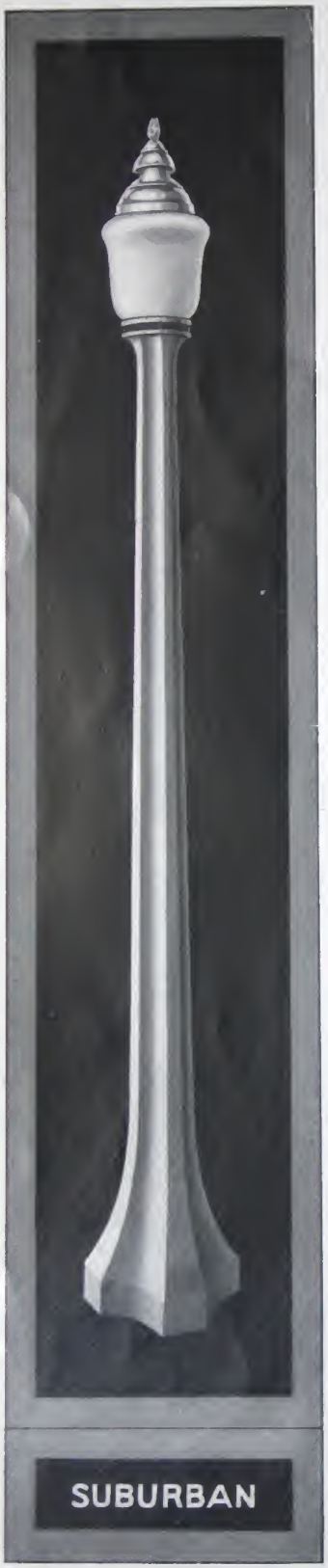


Fig. 3

Engineering Data

The engineering problems to be solved in planning a White-Way system may be explained under the following heads:

1. Selection and arrangement of standards.
2. Efficiency of lamps and lighting units.
3. Underground distribution systems.
4. "Safety First" protective devices.
5. Installation and maintenance costs.

Selection and Arrangement of Standards

The same good judgment should be used in selecting the ornamental post as in selecting a particular type of motor to perform the operations for which it will be used. The "Essentials of White-Way Lighting Systems" explained on a previous page will serve as the best guide to a wise selection for individual requirements.

In the mercantile centers and on the streets immediately adjoining the business districts, the posts are usually set on both sides of the street opposite one another. This arrangement is shown in Fig. 4. The posts are spaced from 65 to 100 feet apart, depending upon the average length of the block and the width of the street. In large cities, 1,000-candlepower lamps are recommended. In cities of 10,000 to 50,000 inhabitants 600-candlepower lamps are generally used, whereas for smaller cities lamps rated at 400-candlepower are considered sufficiently large to secure the results desired. Lamps as small as 250-candlepower have been used successfully in small cities and towns.

In the residence districts, along the boulevards and in parks, where long distances are covered by the lighting circuit, it is economical to stagger the posts according to the plan shown in Fig. 5. The distance between two posts on the same side of the street is usually from 100 to 150 feet. For residential streets and parks, lamps of 100 or 250-candlepower rating are recommended. For boulevards, lamps of various sizes up to and including 600-candlepower are used. The size to be recommended will depend upon the prominence of the thoroughfare, the amount of travel on it after dark, the kind of pavement, etc.

The services of our Engineering Department in solving any particular problem are available without cost or obligation.

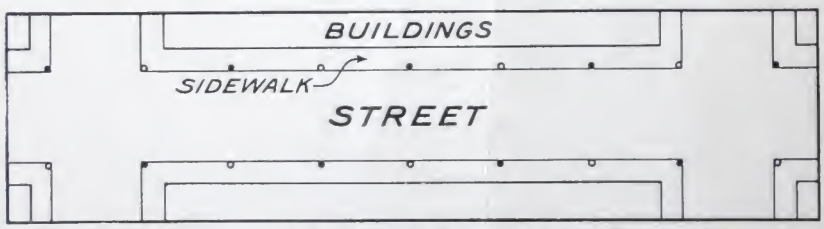


Fig. 4—*An Arrangement of Standards Recommended for Business Districts*

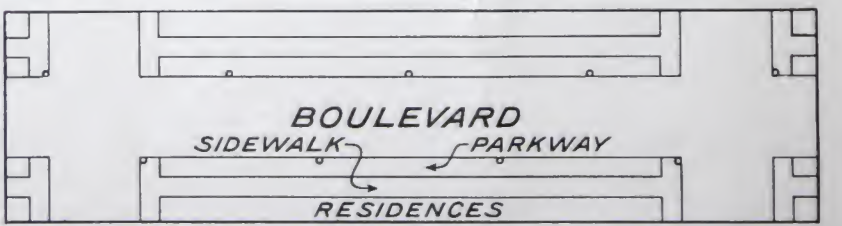


Fig. 5—*Posts Staggered for Boulevard Lighting*

Engineering Data

Efficiency of Lamps

The lamp efficiencies given in the table below show conclusively that series lamps are preferred to multiple. For this reason, the series system is commonly used to distribute the current to the lamps, but certain modifications as are hereinafter described may be employed wherever local conditions show them to be advisable.

Table showing comparison in illuminating values of multiple clusters and single units of series lamps

Multiple or Series	*Sizes of Lamps*	*Total Lumens*	*Total Rated Candlepower*	*Total Watts at the Lamp*	*Efficiency in Lumens per Watt*
Multiple	1-60 Watt 4-40 Watt	2,096	166	220	9.5
Multiple	1-100 Watt 4-60 Watt	3,350	266	340	9.9
Series	1-400 C.P. 6.6 Amp.	4,000	400	245	16.3
Series	1-400 C.P. 15 Amp.	4,000	400	229.5	17.4
Series	1-600 C.P. 6.6 Amp.	6,000	600	367	16 3
Series	1-600 C.P. 20 Amp.	6,000	600	310	19.3
Series	1-1000 C.P. 20 Amp.	10,000	1,000	518	19.3

By comparing the illuminating values in the table above, it will be found that a 400-candlepower series lamp gives 4,000 lumens, or approximately 90 per cent more light than one 60-watt and four 40-watt multiple lamps, while consuming only ten per cent more power. Therefore the efficiency of the single lamp is from 70 to 90 per cent greater than the cluster of five lamps.

Comparing the 600-candlepower lamp with one 100-watt and four 60-watt lamps, approximately 80 per cent more light is obtained and the power consumed is *nine per cent less*. The efficiency of the single lamp is 95 per cent greater than the cluster of five lamps.

Efficiency of Lighting Units

The illuminating value of the post top depends not only on the efficiency of the lamp but also on the glassware enclosing the lamp. The illuminating values given in the table above apply to bare lamps. When consideration is given to the amount of light absorbed by one globe as compared to five, the superiority of the single light unit over the cluster is fully realized.

Cutter Sol-lux Globes

Only glass of highest quality is used with Cutter Ornamental Fixtures. The percentage absorption is low. The concentrated filament of the Mazda "C" lamp is entirely concealed, so that the glare ordinarily resulting from light sources of high intrinsic brilliancy is eliminated. The light is correctly distributed over the street surfaces, sidewalks and building fronts, and is properly diffused. The result is a pleasing white light more nearly approaching sunlight than can be obtained with any other artificial illumination available for commercial purposes today.

Other important points to be considered in the selection of ornamental lighting units are given on the pages following. These relate particularly to the efficiency of the complete installation.

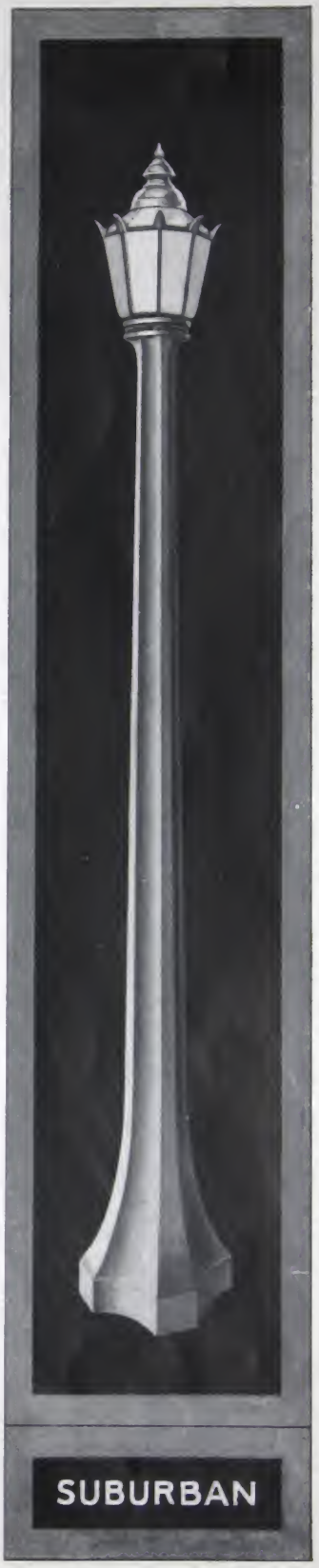


Fig. 6

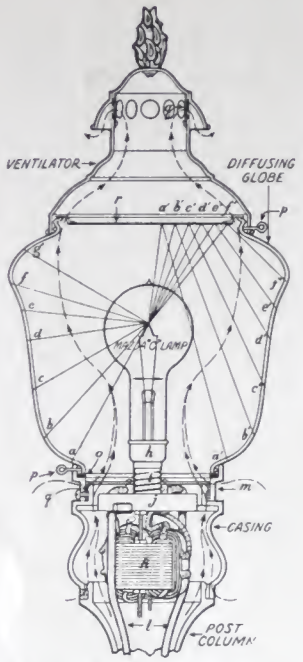


Fig. 7—*Sectional View of Sol-lux Senior Top*

Fig. 9—*Sol-lux Senior Top*

Fig. 10—*Octagonal Senior Top*

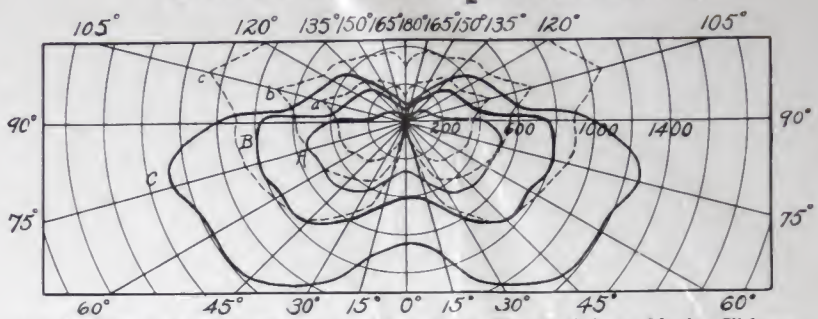


Fig. 8—*Curves a, b, and c, show light distribution of 400, 600 and 1000 c. p. Mazda "C" lamps. Curves A, B, and C show light distribution of same lamps in Sol-lux Senior Globes.*

Parts for Sol-lux and Octagonal Post Tops

Arcadian Casing

The fixture shown in Fig. 7 is the top part of the Arcadian Post illustrated on Page 3. The casing (or extension capitol) fits directly on the column and receives a compensator suspended beneath the porcelain disc illustrated in Fig. 16. Two tapered holes in the disc allow the cable to pass through and be hermetically sealed when connected to the socket terminals. This relieves the socket of the strain due to the weight of the cable and forms a pothead type of connection in the top of the post.

Spring Globeholder

The globe ring (*m*), is a separate piece. It fits either the casing or the column, so that if the compensator should be omitted the casing likewise may be omitted. The globe ring is provided with an insect screen and with a globe seat made of felt. It has a spring globeholder which reduces the cost of upkeep by protecting expensive globes from breakage. This is often a considerable item in localities where severe weather conditions cause an uneven expansion and contraction of metal against glass. Frequently globes are broken by careless tightening of set screws. The spring globeholder eliminates this danger. The globes are more easily and quickly fastened in the holders than when three or more screws are used. When assembled, they are protected from breakage as a result of vibration.

Sol-lux and Octagonal Globes

The globe shown in Fig. 15 transmits the greater part of the useful light to the sidwalks and streets, but there is sufficient illumination to show the outlines of building fronts. These results will be apparent by reference to the polar diagrams shown in Fig. 8. Globes with metal trimmings are desirable because of the lantern effects produced. The metal is narrow and the illumination, therefore, is not changed appreciably by the loss of the light which is intercepted by the metal trimmings. The globes are made of high efficiency glass, especially adapted for use with Mazda "C" lamps.

Porcelain Enameled Ventilators

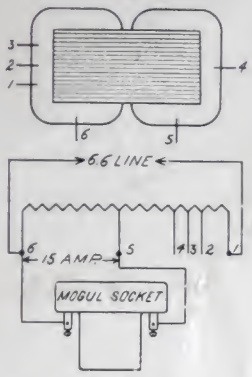
The ventilator for the top of the globe is made of steel and is regularly finished in black porcelain enamel outside and white inside. Other colors, such as green outside to match posts with verde green finish, or white outside and inside to match the globe, will be furnished when ordered in quantities.

Porcelain enamel is a vitreous covering. It protects the steel from rust and makes the ventilator easy to clean.

Cutter Sol-lux Fixtures

Diagrams of Connections for Compensator Coils

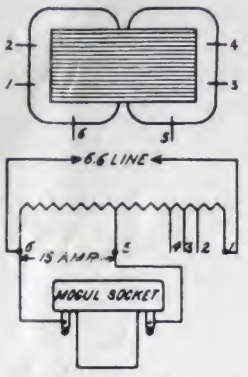
Fig. 11
216-350 Watt Coil



400 C. P.

Connect lamps to taps 5 and 6.
Connect one line to tap 6.
Connect other line to:
Tap 1 for 6.6 amp. line and 15 amp. lamp, 400 C. P.
Tap 2 for 7.5 amp. line and 15 amp. lamp, 400 C. P.
Tap 3 for 6.6 amp. line and 12 amp. lamp, 400 C. P.
Tap 4 for 7.5 amp. line and 12 amp. lamp, 400 C. P.

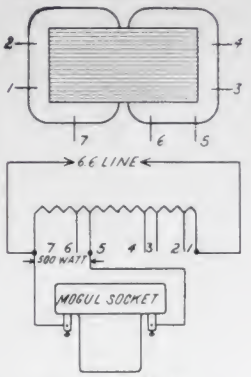
Fig. 12
216-350 Watt Coil



400-600 C. P.

Connect lamps to taps 5 and 6.
Connect one line to tap 6.
Connect other line to:
Tap 1 for 6.6 amp. line and Tap 2 for 7.5 amp. line and 20 amp. lamp, 600 C. P.
Tap 3 for 6.6 amp. line and 15 amp. lamp, 400 C. P.
Tap 4 for 7.5 amp. line and 15 amp. lamp, 400 C. P.

Fig. 13
216-350 Watt Coil



600-1000 C. P.

For 500 W. (1,000 C. P.) lamp connect socket to taps 5 and 7 and series line to taps 1 and 7 for 6.6 amp. service, and to taps 2 and 7 for 7.7 amp. service.
For 300 W. (600 C. P.) lamp connect socket to taps 6 and 7 and series line to taps 3 and 7 for 6.6 amp. service, and to taps 4 and 7 for 7.5 amp. service.

Auto-Transformers (or Compensator Coils)

The demand for increased efficiencies in lighting systems led the lamp manufacturers to produce series Mazda lamps, which operate at 15 and 20 amperes. In order that these lamps might be operated on standardized series circuits of 6.6 or 7.5 amperes auto-transformers were designed for use with each lamp. The current is taken from the line at either 6.6 or 7.5 amperes and delivered to the lamp at 15 amperes for 400-candlepower lamps and 20 amperes for 600 and 1,000-candlepower lamps.

Regent Film Sockets

With auto-transformers for 15 or 20-ampere lamps, mogul base multiple sockets are used. Since the 400 and 600-candlepower lamps are available for connection directly in series on 6.6 or 7.5-ampere circuits, the initial cost of the system may be reduced by omitting the auto-transformers. *In that case, Regent Film Sockets are used. This socket is the series line safety-valve. It uses a perfectly calibrated film protecting the lamp from damaging line surges and reducing lamp renewal expense to a minimum.*

It should be noted, however, that a considerable increase in efficiency is obtained by the use of 15 and 20-ampere lamps as compared to 6.6 or 7.5-ampere lamps. (See table on page 5.) Whether this saving warrants the additional expense of installing auto-transformers depends on local conditions for each particular installation. Our Engineering Service Department will solve such problems as these without expense to those interested.

Reactance Coils

For installations of series lamps not larger than 250-candlepower a reactance coil may be substituted for the auto-transformer. A mogul base multiple socket is used and no regulating equipment is required. (See description of underground distribution systems on next page.)

Fig. 14—*Ventilator with Reflector*

Fig. 15—*Sol-lux Senior Globe*

Fig. 16—*Porcelain Disc Insulator with Compensator, Mogul Socket and Lamp*

Fig. 17—*Arcadian Extension Capitol*

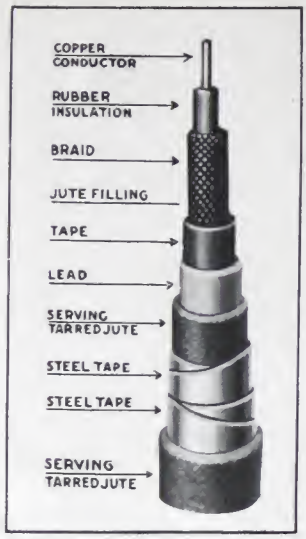


Fig. 18—*Construction of Cable*

Fig. 19—*Laying Cable in Dirt Inside of Curb*

Fig. 20—*Laying Cable Under Brick Outside of Curb*

Design of Underground Distribution Systems

The initial cost of a White-Way lighting system depends largely upon the design of the underground system of distribution and upon the selection of the cable. The high-potential series system of distribution is generally used for single light post installations. There are several variations that may be considered, as follows:

1. Constant-current series system using a multiple socket and auto-transformer with each lamp. This equipment is described on the previous page. When one or more lamps burn out, a regulating transformer takes care of the difference in the load and maintains the current practically constant.
2. Constant-current straight series system using the Cutter Regent Film Socket with each lamp. In the event of a lamp burning out, the perfectly calibrated film in the Regent Socket punctures, thus re-establishing the circuit instantly. This system is operated through a regulating transformer the same as is described in (1) above.
3. Constant-potential series system using an individual two-winding (or so-called series multiple) transformer placed in the ground at the base of each post. The transformers are connected in series and each one delivers the amount of current required for the lamp at a voltage equal to that of only one lamp. This system may be operated either from constant potential mains or in series with other lamps using film sockets and supplied through a regulating transformer.
4. Constant-potential series system using a multiple socket and reactance coil with each lamp. This system requires no regulating apparatus at the station. When a lamp burns out, there is sufficient reactance inserted in the line to maintain the current practically constant.

Cable for Underground Distribution Systems

The cost of laying cable is a large part of the labor charges in the installation of a White Way. This is reduced to a minimum by the use of steel taped cable. A section of this cable showing how it is constructed to protect the conductors and insulate them from ground is shown in Fig. 18. It may be laid just beneath a brick or asphalt pavement or in a shallow trench (See Fig. 19). After the cable is laid, the trench is refilled with earth or paving material.

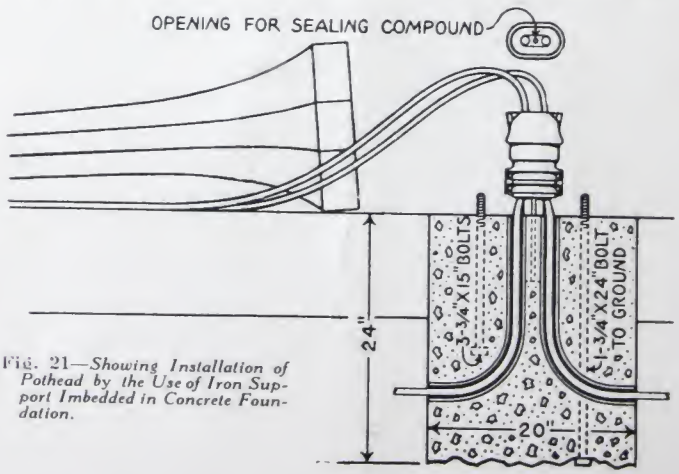


Fig. 21—*Showing Installation of Pothead by the Use of Iron Support Imbedded in Concrete Foundation.*

"Safety-First" Cutter Disconnecting Potheads

On account of the necessity of bringing the cable above the surface of the ground at each post location and opening it for making connections to the inside wiring of the posts, static discharges may occur frequently and ultimately break down the connections, causing interruption of service unless some means is provided to carry the static current to ground. Such troubles are entirely eliminated by installing a pothead in the base of each post. This device clamps together the lead and steel coverings respectively and connects them to ground through the base of the post or the ground support illustrated in Figs. 24 and 25. The porcelain body forms a receptacle where the cables are connected and sealed in with insulating compound.

The Cutter Disconnecting Pothead illustrated below has a two-piece porcelain body so arranged that in the event of breakage of a post by a heavy motor truck or fire apparatus moving at high speed, the upper part is pulled off, thus disconnecting the wires in the post from the underground system. These wires carry power at a voltage which would endanger the lives of pedestrians or vehicle drivers coming in contact with them when the post is broken. Also, the circuit is re-established through the lower part of the pothead so that other lamps in the system continue to burn.

The Cutter Disconnecting Pothead is not only an important "Safety-First" device but it saves its cost many times over in reduced "trouble shooting" expense. Ground tests are very easily made by opening the door in the base of the post, removing the upper porcelain and inserting a plug in its place. The ground testing plug is connected to one side of a magneto while the other side is connected to ground. If the magneto rings it is easily determined on what part of the circuit the ground has occurred. In this way, the trouble is quickly located and outage penalties saved.

Installation Costs

The cost of installing White-Way lighting systems varies from $50 to $150 per post, depending upon the size and type of post selected, the method of underground distribution, the kind of pavement and local labor conditions. Complete designs of White-Way lighting systems and estimates giving costs in detail will be prepared by our Engineering Service Department without charge to those interested in ornamental street lighting.

Fig. 22
Two-Winding Transformer

Fig. 23
Disconnecting Pothead Assembled

Fig. 21
Parts for Disconnecting Pothead

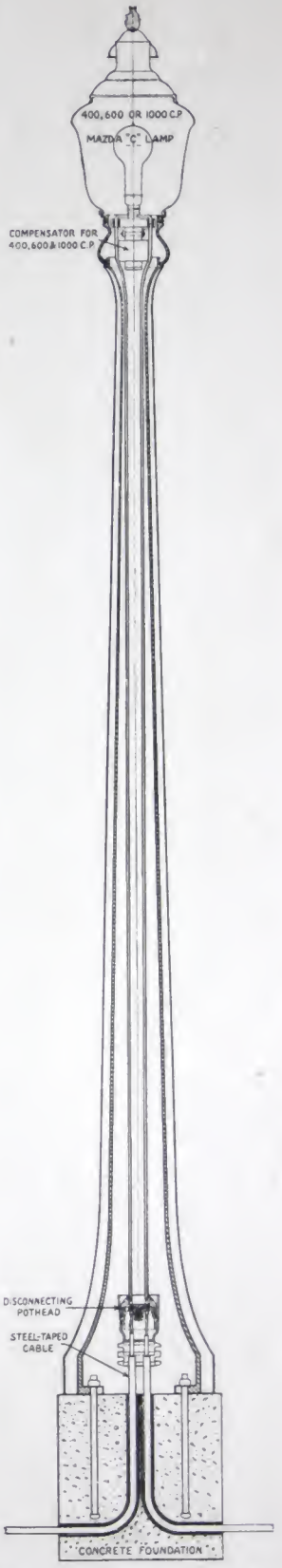


Fig. 25—*Sectional View of Arcadian Post Showing Pothead in Base*

Cutter Arcadian and Suburban Posts

Cutter Arcadian and Suburban Posts With Sol-lux and Octagonal Tops

Dimensions of Posts

The Arcadian post has a 20″ octagonal base and the Suburban has a 16″ octagonal base. The height from ground to bottom of globe when an extension capitol is not used is 12′ for the Arcadian and 10′ for the Suburban. The extension capitol, which provides for the use of compensators for 15 and 20-ampere lamps, and which is designed to fit either post, adds 6″ to the height. It also may be used with sockets for multiple and straight series lamps without compensators or reactance coils. The height from ground to center of light source is 12′ 8″ for the Arcadian post without extension capitol, and 13′ 2″ with extension capitol. The height from ground to center of light source is 10′ 6″ for the Suburban without extension capitol, and 11′ with extension capitol.

Price List of Posts

Prices below cover Arcadian posts with the new style Sol-lux Senior and Octagonal Senior tops, and Suburban posts with the new style Sol-lux Junior and Octagonal Junior tops. Prices do not include lamps, wiring or foundation bolts. Four ¾″ bolts should be used for each post.

Description	*With Sol-lux Top*			*With Octagonal Top*		
	Trade No.	*Shipping Weight*	*Price Each*	*Trade No.*	*Shipping Weight*	*Price Each*
Arcadian, with Regent film socket for straight series lamps	24196	425	$69.00	24212	430	$70.00
Same, with extension capitol	24197	440	74.00	24213	445	75.00
Arcadian, with mogul screw multiple socket for 300 to 1,000-watt lamps	24198	425	68.00	24214	430	69.00
Same, with extension capitol	24199	440	73.00	24215	445	74.00
Arcadian, with extension capitol, mogul socket and compensator* for 400 candlepower, 15 ampere lamps	24200	447	78.00	24216	452	79.00
Same, for 600 candlepower, 20 ampere lamps	24201	449	79.00	24217	454	80.00
Same, for 1,000 candlepower, 20 ampere lamps	24202	454	81.00	24218	459	82.00
Suburban, with Regent film socket for straight series lamps	24203	270	52.00	24219	273	53.00
Same, with extension capitol	24204	285	57.00	24220	278	58.00
Suburban, with medium screw multiple socket for 200-watt or smaller lamps	24205	270	50.70	24221	273	51.70
Same, with extension capitol	24206	285	55.70	24222	278	56.70
Suburban, with mogul screw multiple socket for 300 to 500-watt lamps	24207	270	51.00	24223	273	52.00
Same, with extension capitol	24208	285	56.00	24224	278	57.00
Suburban, with extension capitol, mogul screw socket and reactance coil* for 100 candlepower, 6.6 ampere lamps	24209	273	64.10	24225	278	65.10
Same, with reactance coil for 250 c. p., 6.6 ampere lamps	24210	275	65.50	24226	280	66.50
Same, with compensator for 400 c. p., 15 ampere lamps	24211	277	66.00	24227	282	67.00

Egyptian Senior and Junior globes, metal frames and ventilators will be substituted for Octagonal Senior and Junior globes, metal trimmings and ventilators when so ordered without additional charge.

* Compensator coils and reactance coils are designed for use on 60-cycle circuits only. Prices of posts with coils for operation on 25-cycle circuits will be furnished upon application. Compensator coils have taps for either 6.6 or 7.5-ampere primary circuit. See wiring connections on page 6.

Potheads

With the Suburban post, an iron bracket support should be imbedded in the concrete foundation, and the connections to the cable made before raising the column upon its foundation. The Arcadian post, however, may be furnished with a V-shaped groove in the base to receive the cast-iron body of the pothead. In ordering potheads give external diameter of cable.

Trade No.	*Description*	*Shipping Weight*	*Price Each*
23156	Simple pothead	10	$3.00
23496	Disconnecting type pothead	12	6.00
23156A	Sealing compound for either of above (one pound for each pothead)	1	.12
23156B	Cast-iron ground support for either of above potheads	5	.75
23497	Ground testing plug for disconnecting pothead	3	1.00

All prices f. o. b. factory, South Bend, Indiana, and subject to Schedule "I" discounts.

CUTTER SOLOLUX FIXTURES

George Cutter Company

Manufacturers of

ELECTRICAL LIGHTING FIXTURES and DISTRIBUTING APPARATUS

Main Office and Factory

SOUTH BEND, INDIANA

CHICAGO NEW YORK

LOS ANGELES DETROIT SEATTLE SAN FRANCISCO

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